

02716.0005.NPUS01.ST25.txt  
SEQUENCE LISTING

<110> JENSEN, Rasmus B.  
KELEMEN, Bradley

<120> PROTEORHODOPSIN MUTANTS WITH IMPROVED OPTICAL CHARACTERISTICS

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<150> 60/429,518

<151> 2002-11-26

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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
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Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
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Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
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Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
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 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
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 Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
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Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Asn Ala Trp Gly Ala Phe Val Ile Gly Cys Leu Ala  
 145 150 155 160

Trp val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ala Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
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Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
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Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
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Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
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Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
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Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
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Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
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Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
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Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe
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Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu
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Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr
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Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg
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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr
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Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ala Ala  
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Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
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Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
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Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
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Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
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Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
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Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
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 130 135 140

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Trp Leu Tyr Met Ile Tyr Glu Leu His Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Lys Ile Ile Val Ile Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
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Gly Tyr Leu Met Ser Gly Asp Gly Val Tyr Ala Ser Asn Leu Asn Leu  
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Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
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756

<210> 17  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 17

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
 1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Asn Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Ala Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
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<210> 18  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 18

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
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Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
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Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Asn Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Ala Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

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 <211> 753  
 <212> DNA  
 <213> Marine eubacteria

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 aaaacatcat taactgtatc tggcttggtt actggtattg ctttctggca ttacatgtac 240  
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<210> 20  
 <211> 753  
 <212> DNA  
 <213> Marine eubacteria

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 tggaatgttg ctgttaaaga atcttctaata gct 753

<210> 21  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 21

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
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Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu

130

135

140

Ala Gly Ile Met Asn Ala Trp Gly Ala Phe Val Ile Gly Cys Leu Ala  
145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ala Ala  
165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

&lt;210&gt; 22

&lt;211&gt; 753

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 22

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ttactaacag ttctcttatt aatatgtgaa ttctacttaa ttcttgctgc tgcaactaat 360  
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tgggtataca tgatttatga actatgggct ggagaaggca aggctgcatg taatactgca 540  
agtcctgctg tgcaatcagc ttacaacaca atgatgtata taatcatctt tggttgggca 600  
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tggaatgttg ctgttaaaga atcttctaata gct 753

<210> 23  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 23

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
 1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gln Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Ala Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220



Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Leu Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 24  
 <211> 753  
 <212> DNA  
 <213> Marine eubacteria

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 aaaacatcat taactgtatc tggctctggt actggtattg ctttctggca ttacatgtac 240  
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<210> 25  
 <211> 249  
 <212> PRT  
 <213> Marine eubacteria

<400> 25

Thr Met Gly Lys Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
 1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Ala Ala Asn Val Ala Gly Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala  
165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser  
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<210> 26  
<211> 748  
<212> DNA  
<213> Marine eubacteria

<400> 26  
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gctttattag catctactgt atttttcttt gttgaaagag atagagtttc tgcaaaatgg 180  
aaaacatcat taactgtatc tggtcttggt actggtattg ctttctggca ttacatgtac 240

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gttgctggat cattatttaa gaaattacta gttggttctc ttgttatgct tgtgtttggt 420
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<210> 27
<211> 251
<212> PRT
<213> Marine eubacteria

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<400> 27

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Thr Met Gly Lys Leu Leu Ile Ile Gly Ser Val Ile Ala Leu Pro
1           5           10           15

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Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly
           20           25           30

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Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe
           35           40           45

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Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu
           50           55           60

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Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr
65           70           75           80

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Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg
           85           90           95

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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr
           100          105          110

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Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys
           115          120          125

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Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu
           130          135          140

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Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Tyr Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 28  
 <211> 753  
 <212> DNA  
 <213> Marine eubacteria

<400> 28  
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<210> 29  
 <211> 249

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 29

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro  
 1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Ala Gly Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Asn Ala Trp Gly Ala Phe Val Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ala Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Asn Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser  
245

<210> 30  
<211> 748  
<212> DNA  
<213> Marine eubacteria

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tggaatgttg ctgttaaaga atcttcta 748

<210> 31  
<211> 251  
<212> PRT  
<213> Marine eubacteria

<400> 31

Thr Met Gly Lys Leu Leu Arg Ile Leu Gly Ser Val Ile Ala Leu Pro  
1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
Page 26

65

70

75

80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala  
165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Tyr Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

&lt;210&gt; 32

&lt;211&gt; 753

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 32

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gctctattag catctactgt atttttcttt gttgaaagag atagagtttc tgcaaaatgg 180

aaaacatcat taactgtatc tggcttgggt actggtattg ctttctggca ttacatgtat 240

atgagaggag tatggattga aactggtgat tcgccaactg tatttagata cattgattgg 300

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tggaatgttg ctgttaaaga atcttcta at gct 753

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<210> 33
<211> 251
<212> PRT
<213> Marine eubacteria

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<400> 33
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Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro
1 5 10 15

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Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly
20 25 30

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Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe
35 40 45

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Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu
50 55 60

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Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr
65 70 75 80

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Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg
85 90 95

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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr
100 105 110

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Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys
115 120 125

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Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu
130 135 140

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Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala
145 150 155 160

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Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Ala Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
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 tggaatgttg ctgttaaaga atcttcta at gct 753

<210> 35  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

&lt;400&gt; 35

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 1 5 10 15

Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ser Val Gln Ser Ala Tyr Asn Thr Met Met  
 180 185 190

Ala Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
 195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp Asn Ala Ala Val Lys Glu Ser Ser Asn Ala  
 Page 30

<210> 36  
 <211> 753  
 <212> DNA  
 <213> Marine eubacteria

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<210> 37  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 37

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Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala  
145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala  
165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Tyr Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
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Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

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gttgctggat cattatttaa gaaattactt gttggttctc ttgttatgct tgtgtttggt 420  
Page 32

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<210> 39  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 39

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Thr Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly  
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Val Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu  
 130 135 140

Ala Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Val Gly Cys Leu Ala  
 145 150 155 160

Trp Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala  
 165 170 175

Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met  
180 185 190

Tyr Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr  
195 200 205

Gly Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile  
225 230 235 240

Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

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tggaatgttg ctgttaaaga atcttctaata gct 753

<210> 41  
<211> 252  
<212> PRT  
<213> Marine eubacteria

<400> 41

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
Page 34

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1              5              10              15
Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
      20      25      30
Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
      35      40      45
Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu
      50      55      60
Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr
      65      70      75      80
Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg
      85      90      95
Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr
      100      105      110
Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys
      115      120      125
Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu
      130      135      140
Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Leu Gly Met Ala Gly
      145      150      155      160
Trp Leu Tyr Met Ile Tyr Glu Leu His Met Gly Glu Gly Lys Ala Ala
      165      170      175
Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met
      180      185      190
Lys Ile Ile Val Ile Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala
      195      200      205
Gly Tyr Leu Met Ser Gly Asp Gly Val Tyr Ala Ser Asn Leu Asn Leu
      210      215      220
Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile
      225      230      235      240
Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala
      245      250

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&lt;210&gt; 42

&lt;211&gt; 756

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 42

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aacttaaacc ttatatataa ctttgctgac tttgttaaca agattctatt tggtttgatc    720
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&lt;210&gt; 43

&lt;211&gt; 252

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 43

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Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro
1           5           10           15

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Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
          20           25           30

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Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
          35           40           45

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Phe Phe Val Glu Arg Asp Gln Val Ser Ala Glu Trp Lys Thr Ser Leu
50           55           60

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Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr
65           70           75           80

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Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg
          85           90           95

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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

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 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctgagtgg 180  
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<210> 45  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 45

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20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Cys Thr Asn Val Ala Ala Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Trp Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met

180

185

190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

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 <212> DNA  
 <213> Marine eubacteria

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<210> 47  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 47

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
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Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Ser Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 48  
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 <212> DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 48

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atztatcctg ctggatatgc tgctggttac ctaatgggtg gcgaagggtg atacgcttca    660
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&lt;210&gt; 49

&lt;211&gt; 252

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 49

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Thr Met Gly Lys Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro
1          5          10         15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
          20         25         30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
          35         40         45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu
          50         55         60

Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr
65         70         75         80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg
          85         90         95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr
          100        105        110

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Leu Ile Leu Ala Ala Cys Thr Asn Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Trp Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Val Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 50  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 50  
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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttactgtatc tggtttaatt actggtatag ctttttggca ttatctctat 240  
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 ttattaactg ttccattaca aatgggttgag ttctatctaa ttcttgctgc ttgtacaaat 360  
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 tttgcaggcg aagctggatt agctcctgta tggcctgctt tcattattgg tatggctgga 480  
 tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca 540  
 agtcctgctg ttaactctgc atacaacgca atgatgggtga ttattgttgt tggatgggca 600

atttatacctg ctggatatgc tgctgggttac ctaatgggtg gcgaagggtg atacgcttca 660  
aacctaaacc ttatatataa ccttgctgac tttgttaaca agattctatt tggtttgatc 720  
atttggaatg ttgctgttaa agaattcttct aatgct 756

<210> 51  
<211> 252  
<212> PRT  
<213> Marine eubacteria

<400> 51

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
1 5 10 15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 52  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 52  
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 aaaacttcac ttactgtatc tggtttaatt actggtatag ctttttggca ttatctctat 240  
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 atttatcctg ctggatatgc tgctgggttac ctaatgggtg gcgaagggtg atacgcttca 660  
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 atttggaatg ttgctgttaa agaattcttct aatgct 756

<210> 53  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 53

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
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Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 20 25 30



Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
           35                          40                          45  
 Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
   50                          55                          60  
 Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
   65                          70                          75                          80  
 Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
                           85                          90                          95  
 Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Val Val Glu Phe Tyr  
                          100                         105                         110  
 Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
          115                         120                         125  
 Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
   130                         135                         140  
 Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
  145                         150                         155                         160  
 Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
                          165                         170                         175  
 Val Ser Thr Ala Ser Pro Ala Val Asn Pro Ala Tyr Asn Ala Met Met  
          180                         185                         190  
 Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
   195                         200                         205  
 Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
   210                         215                         220  
 Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
  225                         230                         235                         240  
 Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
                          245                         250

<210> 54  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria  
 <400> 54

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ttattaactg ttccattaca agtggttgag ttctatctaa ttcttgctgc ttgtacaagt   360
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atztatcctg ctggatatgc tgcctggttac ctaatgggtg gcgaagggtg atacgcttca   660
aacttaaacc ttatatataa ccttgctgac tttgttaaca agattctatt tggtttgatc   720
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<210> 55
<211> 252
<212> PRT
<213> Marine eubacteria

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<400> 55
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Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro
1           5           10           15

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Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
          20           25           30

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Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
          35           40           45

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Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu
          50           55           60

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Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr
65           70           75           80

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Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg
          85           90           95

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```

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr
          100          105          110

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Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys

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115

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu His Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
180 185 190

Lys Ile Ile Val Ile Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
195 200 205

Gly Tyr Leu Met Ser Gly Asp Gly Val Tyr Ala Ser Asn Leu Asn Leu  
210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 56  
<211> 756  
<212> DNA  
<213> Marine eubacteria

<400> 56  
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ggtatgttag cggcaactgt attctttttt gtagaaagag accaagtcag cgctaagtgg 180  
aaaacttcac ttactgtatc tggtttaatt actggtatag ctttttggca ttatctctac 240  
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ttattaactg ttccattaca aatggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
gttgctgctt cattatttaa gaagcttcta gctggttcat tagtaatgtt aggtgctgga 420  
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atttatcctg ctggatatgc tgctggttac ctaatgagtg gtgacggtgt atacgcttca 660

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 atttggaatg ttgctgttaa agaattctct aatgct 756

<210> 57  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria  
 <400> 57

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
 1 5 10 15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Thr Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 58  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 58  
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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttactgtatc tggtttaatt actggtatag ctttttggca ttatctctat 240  
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 aacttaaacc ttatatataa ccttgctgac tttgttaaca agattctatt tggtttgatc 720  
 atttggaatg ttgctgttaa agaattttct aatgct 756

<210> 59  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 59

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Lys Ser Ser Asn Ala  
 245 250

<210> 60  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 60  
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ggtggcgatc ttgatgctag tgactacact ggtgtttcat tctggtagt tactgctgct 120  
 Page 50

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 aatgttgctg ttaaaaaatc ttctaattgct a 751

<210> 61  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 61

Met Gly Lys Leu Leu Ile Leu Gly Asn Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 62  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 62  
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<210> 63  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 63

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Ser Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Ala Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 64  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 64  
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 acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
 agaggtgtat ggatagaaac tggtagtcca cctactgtct ttagatacat tgactggcta 300  
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 atgggtgaag caggaataat ggcagcttg cctgcattca tcattggatg tttagcatgg 480  
 gtatatatga tttatgagct atgggctggt gaaggaaaat ctgcatgtaa tactgcaagt 540  
 cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgctgg ttgggcaatt 600  
 tatcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
 aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 65  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 65

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 Page 54

50

55

60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 66

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 66

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ctattagcgt ctactgtatt cttctttgtt gaaagagata gagtgtctgc aaaatggaaa 180

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 ttaactgtgc ctttactaat atgtgagttc tatctgatac ttgctgcagc tactaatgtt 360  
 gctggttcat tatttaagaa attgctagtt ggttctcttg tgatgcttgt gtttggttac 420  
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 gtatatatga tttatgaact atgggctggt gaaggaaaat ctgcatgcaa tactgcaagt 540  
 cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgttgg ttgggcaatt 600  
 tatkctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
 aaccttattt ataaccttgc tgactttgtt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgc a 751

<210> 67  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 67

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Ser Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Ala Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Asn Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 68  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 68  
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 ctattagcgt ctactgtatt cttctttggt gaaagagata gagtgtctgc aaaatggaaa 180  
 acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
 agaggtgtat ggatagaaac tggtagttca cctactgtct ttagatacat tgactggcta 300  
 ttaacagtgc ctttactaat atgtgagttc tatttaatac ttgccgcagc tactaatggt 360  
 gctggttcat tatttaagaa attgctagtt ggttctcttg ttatgcttgt gttcggttac 420  
 atgggtgaag caggaataat ggcagcttgg cctgcattca tcattgggtg tttagcatgg 480  
 gtatatatga tttatgagct atgggctggt gaaggaaaat ctgcatgtaa tactgcaagt 540  
 cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgctgg ttgggcaatt 600  
 tatcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
 aaccttaatt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 69

&lt;211&gt; 250

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 69

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 Page 58

225

230

235

240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

&lt;210&gt; 70

&lt;211&gt; 751

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 70

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ctattagcgt ctactgtatt cttctttggt gaaagagata gagggtctgc aaaatggaaa 180  
acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
agaggtgtat ggatagaaac tggtagttcg cctactgtct ttagatacat agactgggta 300  
ttaactgtgc ctttactaat atgtgagttc tatctgatac ttgctgcagc tactaatgtt 360  
gctggttcat tattaagaa attgctagtt ggttctcttg tgatgcttgt gtttggttac 420  
atgggtgaag caggaataat ggcagcttgg cctgcattca tcattggatg tttagcatgg 480  
gtatatatga tttatgaact atgggctggg gaaggaaaat ctgcatgcaa tactgcaagt 540  
cctgctgtac aatcagctta caacacaatg atgtatatca tcatcgttgg ttgggcaatt 600  
tatcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
aatgttgctg ttaaagaatc ttctaattgct a 751

&lt;210&gt; 71

&lt;211&gt; 250

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 71

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Ser Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 72

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 72

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ctattagcat ctactgtatt cttctttggt gaaagggata gagtatctgc aaaatggaaa 180

acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240

agaggtgtat ggatagaaac tggtagttca cctactgtct ttagatacat tgactggcta 300



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tatcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660
aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720
aatgttgctg ttaaagaatc ttctaattgt a 751

```

```

<210> 73
<211> 250
<212> PRT
<213> Marine eubacteria

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<400> 73
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Met Gly Lys Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr
1           5           10          15

```

```

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val
20          25          30

```

```

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe
35          40          45

```

```

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr
50          55          60

```

```

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met
65          70          75          80

```

```

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr
85          90          95

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```

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu
100         105         110

```

```

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu
115         120         125

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```

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala
130         135         140

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Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp
145         150         155         160

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Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
                           165                          170                          175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
                           180                          185                          190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Leu Val Gly Tyr Phe Thr Gly  
                           195                          200                          205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
                           210                          215                          220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
                           225                          230                          235                          240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
                           245                          250

<210> 74  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 74  
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 ctaactgtgc ctttactaat ttgtgagttc tacttaatac tagcagcagc tactaacgtt 360  
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 tacctttagt gttattttcac tggttacctt atgggtgacg gtggatcagc tcttaactta 660  
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 aatgttgctg ttaaagaatc ttctaagtct a 751

<210> 75  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

&lt;400&gt; 75

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Ser Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Ala Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 76  
<211> 751  
<212> DNA  
<213> Marine eubacteria

<400> 76  
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ctattagcat ctactgtatt cttctttggt gaaagggata gagtatctgc aaaatggaaa 180  
acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
agaggtgtat ggatagaaac tggtagttca cctactgtct ttagatacat tgactggcta 300  
ttaacagtgc ctttactaat atgtgagttc tatttaatac ttgccgcagc tactaatggt 360  
gctggttcat tatttaagaa attgctagtt ggttctcttg ttatgcttgt gttcggttac 420  
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tattcctgtag gttattttcac aggttaccta atgggtgacg gtggatcagc tcttaatacta 660  
aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
aatgttgctg ttaaagaatc ttctaattgt a 751

<210> 77  
<211> 250  
<212> PRT  
<213> Marine eubacteria

<400> 77  
Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
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Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
20 25 30  
Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
35 40 45  
Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60  
Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 78

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 78

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ctattagcgt ctactgtatt cttctttgtt gaaagagata gagtgtctgc aaaatggaaa 180

acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240

agaggtgtat ggatagaaac tgggtattcg cctactgtct ttagatacat cgactggtta 300

ttaactgtgc ctttactaat atgtgagttc tatctgatac ttgctgcagc tactaatgtt 360

gctggttcat tattaagaa attgctagtt ggttctcttg tgatgcttgt gtttggttac 420  
 atgggtgaag caggaataat ggcagcttgg cctgcattca tcattggatg tttagcatgg 480  
 gtatatatga tttatgaact atgggctggt gaaggaaaat ctgcatgcaa tactgcaagt 540  
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 aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatggtgctg ttaaagaatc ttctaattgct a 751

<210> 79  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 79

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Ala  
 50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Cys Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys

165

170

175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Val Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 80  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 80  
 atgggtaaat tattactgat attaggtagt gttattgcac ttctacatt tgctgcaggt 60  
 ggtggtgacc ttgatgctag tgattacact ggtgtttctt tttggttagt tactgctgct 120  
 ttattagcat ctactgtatt tttctttggt gaaagagata gagtttctgc aaaatggaaa 180  
 acatcattag ctgtatctgg tcttattact ggtattgcgt tctggcattg catgtacatg 240  
 agaggggtat ggattgaaac tggtgattcg ccaactgtat ttagatacat tgattggtta 300  
 ctaacagttc ctctattaat atgtgaattc tacttaattc ttgctgctgc aactaatggt 360  
 gctggatcat tattaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420  
 atgggtgaag caggaatcat ggctgcatgg cctgcattca ttattgggtg tttagcttgg 480  
 gtatacatga tttatgaatt atgggctgga gaaggaaaat ctgcatgtaa tactgcaagt 540  
 cctgctgtgc aatcagctta caacacaatg atgtatatta tcgtctttgg ttgggcgatt 600  
 tctcctgtag gttatttcac aggttacctg atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaagtct 750

<210> 81  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 81

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15  
 Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30  
 Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Ser  
 35 40 45  
 Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60  
 Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80  
 Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95  
 Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110  
 Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125  
 Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140  
 Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160  
 Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175  
 Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190  
 Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205  
 Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220  
 Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240  
 Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250



<210> 82  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 82  
 atgggtaaat tattactgat attaggtagt gttattgcac ttcctacatt tgctgcaggt 60  
 ggtggtgacc ttgatgctag tgattacact ggtgtttctt tttggttagt tactgctgct 120  
 ttattagcat ctactgtatt ttcctttggt gaaagagata gagtttctgc aaaatggaaa 180  
 acatcattaa ctgtatctgg tcttattact ggtattgctt tctggcatta catgtacatg 240  
 agaggggtat ggattgaaac tggtgattcg ccaactgtat ttagatacat tgattggtta 300  
 ctaacagttc ctctattaat atgtgaattc tacttaattc ttgctgctgc aactaatgtt 360  
 gctggatcat tattaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420  
 atgggtgaag caggaatcat ggctgcatgg cctgcattca ttattgggtg tttagcttgg 480  
 gtatacatga tttatgaatt atgggctgga gaaggaaaat ctgcatgtaa tactgcaagt 540  
 cctgctgtgc aatcagctta caacacaatg atgtatatta tcattcttgg ttgggcgatt 600  
 tatcctgtag gttatttcac aggttacctg atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataacctgct tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatggtgctg ttaaagaatc ttctaattgct 750

<210> 83  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 83

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
                   100                  105                  110  
 Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
                   115                  120                  125  
 Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
                   130                  135                  140  
 Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
                   145                  150                  155                  160  
 Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
                   165                  170                  175  
 Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
                   180                  185                  190  
 Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
                   195                  200                  205  
 Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
                   210                  215                  220  
 Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Ser Ile Ile Trp  
                   225                  230                  235                  240  
 Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
                   245                  250

<210> 84  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 84  
 atgggtaaat tattactgat attaggtagt gttattgcac ttcctacatt tgctgcaggt 60  
 ggtggtgacc ttgatgctag tgattacact ggtgtttctt tttggttagt tactgctgct 120  
 ttattagcat ctactgtatt tttctttggt gaaagagata gagtttctgc aaaatggaaa 180  
 acatcattaa ctgtatctgg tcttattact ggtattgctt tctggcatta catgtacatg 240  
 agaggggtat ggattgaaac tggtgattcg ccaaccgtat ttagatacat tgattggtta 300  
 ctaacagttc ctctattaat atgtgaattc tacttaattc ttgctgctgc aactaatgtt 360  
 gctggatcat tatttaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420  
 atgggtgaag caggaatcat ggctgcatgg cctgcattca ttattgggtg tttagcttgg 480

gtatacatga tttatgaatt atgggctgga gaaggaaaat ctgcatgtaa tactgcaagt 540  
 cctgctgtgc aatcagctta caacacaatg atgtatatta tcattcttgg ttgggcgatt 600  
 tatcctgtag gttatttcac aggttacctg atgggtgacg gtggatcagc acttaactta 660  
 aaccttatct ataaccttgc tgactttgtt aacaagattc tatttggttc aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaagtct 750

<210> 85  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 85

Met Gly Lys Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 86  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 86  
 atgggtaaat tattactgat attaggtagt gttattgcac ttcctacatt tgctgcaggt 60  
 ggtggtgacc ttgatgctag tgattacact ggtgtttctt tttggttagt tactgctgct 120  
 ttattagcgt ctactgtatt cttctttggt gaaagagata gagtgtctgc aaaatggaaa 180  
 acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
 agaggtgtat ggatagaaac tgggtgattcg cctactgtct ttagatacat cgactgggta 300  
 ttaactgtgc ctttactaat atgtgagttc tatctgatac ttgctgcagc tactaatggt 360  
 gctggttcat tattaagaa attgctagtt ggttctcttg tgatgcttgt gtttggttac 420  
 atgggtgaag caggaataat ggcagcttgg cctgcattca tcattgggtg tttagcatgg 480  
 gtatatatga tttatgaact atgggctggt gaaggaaaat ctgcatgcaa tactgcaagt 540  
 cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgttgg ttgggcaata 600  
 tatcctgtag gttatttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta 660  
 aaccttatct ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 87  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 87

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
                   20                                  25                                  30  
 Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
                   35                                  40                                  45  
 Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
                   50                                  55                                  60  
 Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
                   65                                  70                                  75                                  80  
 Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
                                   85                                  90                                  95  
 Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
                                   100                                  105                                  110  
 Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
                   115                                  120                                  125  
 Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
                   130                                  135                                  140  
 Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
                   145                                  150                                  155                                  160  
 Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
                                   165                                  170                                  175  
 Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
                   180                                  185                                  190  
 Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
                   195                                  200                                  205  
 Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
                   210                                  215                                  220  
 Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
                   225                                  230                                  235                                  240  
 Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
                                   245                                  250

<210> 88  
 <211> 751

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 88

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atgggtaaat tattactgat attaggtagt gttatcgcgc ttccaacatt tgctgctggc      60
ggtggcgatc ttgatgctag tgactatact ggtgtttcat tctggttagt tactgctgct      120
ctattagcgt ctactgtatt cttctttggt gaaagagata gagtgtctgc aaaatggaaa      180
acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg      240
agaggtgtat ggatagaaac tggtgattcg cctactgtct ttagatacat cgactgggta      300
ttaactgtgc ctttactaat atgtgagttc tatctgatac ttgctgcagc tactaatggt      360
gctggttcat tattaagaa attgctagtt ggttctcttg tgatgcttgt gtttggttac      420
atgggtgaag caggaataat ggcagcttgg cctgcattca tcattggatg tttagcatgg      480
gtatatatga tttatgaact atgggctggt gaaggaaaat ctgcatgcaa tactgcaagt      540
cctgctgtac agtcagctta caacacaatg atgtatatca tcatcgttgg ttgggcaatt      600
tattctgtag gctattttcac aggttaccta atgggtgacg gtggatcagc tcttaatcta      660
aaccttattt ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg      720
aatgttgctg ttaaagaatc ttctaagtct a                                     751

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&lt;210&gt; 89

&lt;211&gt; 250

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 89

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Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr
1           5           10           15

```

```

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val
20           25           30

```

```

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe
35           40           45

```

```

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr
50           55           60

```

```

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met
65           70           75           80

```

```

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr
85           90           95

```

```

Ile Asp Trp Leu Leu Pro Val Pro Leu Ala Ile Cys Glu Phe Tyr Leu

```

100

105

110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

&lt;210&gt; 90

&lt;211&gt; 751

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 90

atgggtaaat tattactgat attaggtagt gttattgcac ttcctacatt tgctgcaggt 60

ggtggtgacc ttgatgctag tgattacact ggtgtttctt tttggttagt tactgctgct 120

ttattagcat ctactgtatt tttctttggt gaaagagata gagtttctgc aaaatggaaa 180

acatcattaa ctgtatctgg tcttggttact ggtattgctt tctggcatta catgtacatg 240

agaggggtat ggattgaaac tgggtgattcg ccaactgtat ttagatacat tgattggtta 300

ctaccagttc ctctagcaat atgtgaattc tacttaattc ttgctgctgc aactaatgtt 360

gctggatcat tattaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420

atgggtgaag caggaatcat ggctgcatgg cctgcattca ttattgggtg tttagcttgg 480

gtatacatga tttatgaatt atgggctgga gaaggaaaat ctgcatgtaa tactgcaagt 540

cctgctgtgc aatcagctta caacacaatg atgtatatta tcattcttgg ttgggcgatt 600  
 tatcctgtag gttatttcac aggttacctg atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataaccttgc tgactttgtt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 91  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 91

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190



Ile Ile Ile Phe Gly Trp Ala Ile Tyr Leu Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 92  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 92  
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 ggtggtgacc tggatgctag tgactacact ggtgtatctt tctggttagt tactgctgct 120  
 ctattagcat ctactgtatt tttctttggt gaaagagaca gagtttctgc taaatggaaa 180  
 acatcattaa cagtatctgg tttagttact ggtattgctt tttggcatta catgtacatg 240  
 agaggtgtat ggattgaaac tgggtgattca ccaactgttt ttagatacat cgactggttg 300  
 ctaactgtgc ctttactaat ttgtgagttc tacttaatac tagcagcagc tactaacggt 360  
 gctgggttctt tattcaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420  
 atgggtgaag caggaattat ggcagcctgg cctgcattca ttataggatg tttagcatgg 480  
 gtatacatga tttatgaatt atgggctgga gaaggaaagt ctgcatgtaa cactgcaagt 540  
 cctgcagttc agtcagctta caacacaatg atgtatatca tcattcttgg ttgggctatt 600  
 taccttgtag gttatttcac tggttaccta atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 93  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 93

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
           35                          40                          45  
 Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
       50                          55                          60  
 Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
   65                          70                          75                          80  
 Arg Gly Val Trp Ile Glu Thr Gly Ser Ser Pro Thr Val Phe Arg Tyr  
                           85                          90                          95  
 Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
                          100                         105                         110  
 Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
                          115                         120                         125  
 Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
      130                         135                         140  
 Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
  145                         150                         155                         160  
 Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
                          165                         170                         175  
 Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
                          180                         185                         190  
 Ile Ile Ile Phe Gly Trp Ala Ile Tyr Leu Val Gly Tyr Phe Thr Gly  
                          195                         200                         205  
 Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
      210                         215                         220  
 Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
  225                         230                         235                         240  
 Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
                          245                         250

<210> 94  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 94  
 atgggtaaat tattactgat attaggtagt gttattgctg ttccaacatt tgccgctggc 60  
 ggtggcgatc ttgatgctag tgactacact ggtgtttctt tctggttagt tactgctgct 120  
 ctattagcat ctactgtatt cttctttgtt gaaagggata gagtatctgc aaaatggaaa 180  
 acttcattaa cagtatctgg tttagttact ggtattgctt tttggcatta tatgtacatg 240  
 agaggtgtat ggatagaaac tggtagttca cctactgtct ttagatacat tgactggcta 300  
 ttaacagtgc ctttactaat atgtgagttc tatttaatac ttgccgcagc tactaatgtt 360  
 gctggttcat tatttaagaa attgctagtt ggttctcttg ttatgcttgt gtttggttac 420  
 atgggtgaag caggaattat ggcagcctgg cctgcattca ttataggatg tttagcatgg 480  
 gtatacatga tttatgaatt atgggctgga gaaggaaagt ctgcatgtaa cactgcaagt 540  
 cctgcagttc agtcagctta caacacaatg atgtatatca tcattcttgg ttgggctatt 600  
 tacctttagt gttatttcac tggttaccta atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataacctgct tgactttgtt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 95  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 95

Met Gly Lys Leu Leu Leu Arg Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
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<210> 96  
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<210> 97  
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<212> PRT  
<213> Marine eubacteria  
<400> 97

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
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Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Ala  
50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
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Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 98  
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<210> 99  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 99

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
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Phe Ala Ala Gly Gly Gly Asp Pro Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 Page 82

35

Phe Val Glu Arg Asp Arg Val Ser Ala Glu Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Glu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Ile Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
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<210> 100

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 100

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<210> 101
<211> 250
<212> PRT
<213> Marine eubacteria

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<400> 101
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Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr
1          5          10          15

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Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val
          20          25          30

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Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe
          35          40          45

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Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr
50          55          60

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Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met
65          70          75          80

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Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr
          85          90          95

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Ile Asp Trp Leu Leu Thr Val Pro Leu Val Ile Cys Glu Phe Tyr Leu
100          105          110

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Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu
115          120          125

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Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 102  
 <211> 751  
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<210> 103  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 103

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
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Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Pro Gly Leu Ile Thr Asp Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 Page 86

210

215

220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 104  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

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<210> 105  
 <211> 249  
 <212> PRT  
 <213> Marine eubacteria

<400> 105

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
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 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Pro Gly Leu Ile Thr Asp Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn  
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<210> 106

<211> 748

<212> DNA

<213> Marine eubacteria

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ttattagcat ctactgtatt tttctttggt gaaagagata gagtttctgc aaaatggaaa 180

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<210> 107  
<211> 250  
<212> PRT  
<213> Marine eubacteria

<400> 107

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Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
35 40 45  
Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60  
Val Pro Gly Leu Ile Thr Asp Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80  
Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95  
Ile Asp Trp Leu Leu Thr Val Ser Leu Gln Ile Cys Glu Phe Tyr Leu  
100 105 110  
Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125  
Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 108

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 108

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&lt;210&gt; 109

&lt;211&gt; 250

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 109

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
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Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Pro Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Ala Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Glu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 110  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

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 agaggggtat ggattgaaac tggtgattcg ccagctgtat ttagatacat tgattgggtta 300  
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<210> 111  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 111

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Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60



Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 112

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 112

atgggtaaat tattagtgat gttaggtagt gttattgctg ttccaacatt tgccgctggt 60

ggtggtgacc tggatgctag tgactacact ggtgtatctt tctggttagt tactgctgct 120

ctattagcat ctactgtatt tttctttggt gaaagagaca gagtttctgc taaatggaaa 180

acatcattaa cagtatctgg tttagttact ggtattgctt tttggcatta catgtacatg 240

agaggtgtat ggattgaaac tgggtgattca ccaactgttt ttagatacat cgactgggtg 300  
 ctaactgtgc ctttactaat ttgtgagttc tacttaatac tagcagcagc tactaacgtt 360  
 gctgggttctt tattcaagaa attactagtt gggttctcttg ttatgcttgt gtttggttac 420  
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 gtatacatga tttatgaatt atgggctgga gaaggaaagt ctgcatgtaa cactgcaagt 540  
 cctgcagttc agtcagctta caacacaatg atgtatatca tcattctttgg ttgggctatt 600  
 taccctgtag gttatttcac tggttacctt atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataaccttgc tgactttggt aacaagattc tatttggttt aattatatgg 720  
 aatgttgctg ttaaagaatc ttctaagtct a 751

<210> 113  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 113

Met Gly Lys Arg Leu Val Ile Leu Gly Ser Val Ile Ala Leu Pro Thr  
1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp

145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Leu Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn 225 Leu Ala Asp Phe Val 230 Asn Lys Ile Leu Phe 235 Gly Leu Ile Ile Trp 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

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<210> 114
<211> 751
<212> DNA
<213> Marine eubacteria
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<400>	114								
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ctattagcat	ctactgtatt	tttctttggt	gaaagagaca	gagtttctgc	taaattggaaa				180
acatcattaa	cagtatctgg	tttagttact	ggtattgctt	tttggcatta	catgtacatg				240
agaggtgtat	ggattgaaac	tggtgattca	ccaactgttt	ttagatacat	cgactgggtg				300
ctaactgtgc	ctttactaat	ttgtgagttc	tacttaatac	tagcagcagc	tactaacggt				360
gctggttctt	tattcaagaa	attactagtt	ggttctcttg	ttatgcttgt	gtttggttac				420
atgggtgaag	caggaattat	ggcagcctgg	cctgcattca	ttataggatg	tttagcatgg				480
gtatacatga	tttatgaatt	atgggctgga	gaaggaaagt	ctgcatgtaa	cactgcaagt				540
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aaccttatct	ataaccttgc	tgactttggt	aacaagattc	tatttggttt	aattatatgg				720
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<210>	115
<211>	250
<212>	PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 115

Met Gly Lys Ala Leu Leu Met Leu Gly Ser Val Ile Ala Leu Pro Thr  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Pro Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Phe Gly Trp Ala Ile Tyr Leu Val Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Arg  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 116  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 116  
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 ggtggtgacc tggatgctag tgactacact ggtgtatctt tctggttagt tactgctgct 120  
 ccattagcat ctactgtatt tttctttggt gaaagagaca gagtttctgc taaatggaaa 180  
 acatcattaa cagtatctgg tttagttact ggtattgctt tttggcatta catgtacatg 240  
 agaggtgtat ggattgaaac tggtgattca ccaactgttt ttagatacat cgactggttg 300  
 ctaactgtgc ctttactaat ttgtgagttc tacttaatac tagcagcagc tactaacggt 360  
 gctggttctt tattcaagaa attactagtt ggttctcttg ttatgcttgt gtttggttac 420  
 atgggtgaag caggaattat ggcagcctgg cctgcattca ttataggatg tttagcatgg 480  
 gtatacatga tttatgaatt atgggctgga gaaggaaagt ctgcatgtaa cactgcaagt 540  
 cctgcagttc agtcagctta caacacaatg atgtatatca tcatctttgg ttgggctatt 600  
 tacctttagt gttatttcac tggttaccta atgggtgacg gtggatcagc tcttaactta 660  
 aaccttatct ataaccttgc tgactttggt aacaagattc tatttggttt aattataagg 720  
 aatgttgctg ttaaagaatc ttctaattgct a 751

<210> 117  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 117  
 Met Gly Lys Gly Leu Leu Met Leu Gly Ser Val Ile Ala Leu Pro Ser  
 1 5 10 15  
 Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30  
 Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45  
 Phe Val Glu Arg Asp Arg Val Ala Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60  
 Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met  
 65 70 75 80

Arg Gly Val Trp Val Glu Thr Gly Glu Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Ile Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Phe Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Ile Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

His Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 118

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 118

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gggtggcgatc ttgatgctag tgactataca ggtgtttcat tctggttggt tactgctgca 120

ttattagcct caactgtttt cttctttggt gaaagagaca gagttgctgc aaaatggaaa 180

acatcgtaa cagtatctgg tcttggtact ggtattgctt tttggcatta catgtacatg 240

agagggggtt gggtagagac tggatgaatca ccaactgtat tcagatatat tgactggcta 300

ctaacagtac cattattaat atgtgagttc tacttaatac ttgcagctgc aactaatgtt 360

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gctggttctt tatttaaaaa gctattaatt ggttctcttg ttatgcttgt gtttggttac 420
atgggtgaag caggaatcat ggcagcttgg cctgcattca ttattgggtg cttagcttgg 480
ttctacatga tttatgaact atgggctggt gaaggaaagt ctgcttgtaa tactgcaagt 540
ccagctgttc aatcagcata caacacgatg atgtatatta ttatcattgg ttgggctatt 600
taccctgtag gttactttac tggttaccta atgggtgacg gcggatctgc cttaaactta 660
aacctaattt ataaccttgc tgacttcggt aacaagattc tatttggttt aattatctgg 720
catgttgctg ttaaagaatc ttctaattgct a 751

```

```

<210> 119
<211> 250
<212> PRT
<213> Marine eubacteria

```

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<400> 119
```

```

Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Ser
1          5          10          15

```

```

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Gly Asp Tyr Thr Gly Val
          20          25          30

```

```

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe
          35          40          45

```

```

Phe Ile Glu Arg Asp Arg Val Ala Ala Lys Trp Lys Thr Ser Leu Thr
50          55          60

```

```

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Met Tyr Met
65          70          75          80

```

```

Arg Gly Val Trp Val Glu Thr Gly Glu Ser Pro Thr Val Phe Arg Tyr
          85          90          95

```

```

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu
100          105          110

```

```

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu
115          120          125

```

```

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala
130          135          140

```

```

Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Val Gly Cys Leu Ala Trp
145          150          155          160

```

Phe Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190

Ile Ile Ile Ile Gly Trp Ala Ile Tyr Pro Leu Gly Tyr Phe Thr Gly  
 195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

His Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 120  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 120  
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 ggcggcgacc ttgatgctgg tgattacact ggtgtagtt tttggtagt gactgcagct 120  
 cttttggctt caactgtatt tttctttatt gaaagagata gagttgctgc taaatggaag 180  
 acatctttaa cagtatctgg tctagttact ggtattgctt tctggcatta catgtacatg 240  
 agaggtgttt gggtcgaaac tggatgaatca ccaactgtat tcagatatat tgactggcta 300  
 cttacagtgc ctttattaat atgtgagttt tatctgattc ttgcagctgc aactaatggt 360  
 gctggttctt tatttaagaa gcttttagtt ggttctcttg taatgcttgt atttggttat 420  
 atgggcgaag caggaattat ggcagcttgg cctgcattca ttgttgatg ttttagcttgg 480  
 ttctatatga tttatgagct atgggctgga gaaggaaaat ctgcatgcaa tactgcaagt 540  
 ccagctgttc aatcagcata caacacaatg atgtatatta ttatcattgg ttgggctatt 600  
 tatcctcttg ggtactttac tggttacctt atgggtgacg gcggatcagc cttaaaactta 660  
 aacctaattt ataaccttgc tgactttgtt aacaagattc tatttggttt aatcatatgg 720  
 catgtcgctg ttaaagaatc ttctaagtct a 751

<210> 121  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 121



Met Gly Lys Gln Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Ser  
 1 5 10 15  
 Phe Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30  
 Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45  
 Phe Ile Glu Arg Asp Arg Val Ala Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60  
 Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80  
 Arg Gly Val Trp Val Glu Thr Gly Glu Ser Pro Thr Val Phe Arg Tyr  
 85 90 95  
 Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
 100 105 110  
 Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125  
 Leu Ile Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
 130 135 140  
 Gly Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
 145 150 155 160  
 Val Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
 165 170 175  
 Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
 180 185 190  
 Ile Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly  
 195 200 205  
 Tyr Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr  
 210 215 220  
 Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240  
 His Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250  
 Page 101

<210> 122  
 <211> 751  
 <212> DNA  
 <213> Marine eubacteria

<400> 122  
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 ggtggcgatc ttgatgctag tgactataca ggtgtttcat tctggttagt tactgctgca 120  
 ttattagcct caactgtttt cttttttatt gaaagagaca gagttgctgc aaaatggaaa 180  
 acgtcgtaa cagtatctgg ccttggtact ggtattgctt tttggcacta cttgtatatg 240  
 agaggagttt gggtagagac tggtagaatca ccaactgtat tcagatatat tgactgggta 300  
 ctaacagtac cattattaat atgtgagttt tacttaatac ttgcagctgc aactaatgtt 360  
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 gtctatatga tatatgagct atgggctggt gaaggaaaat ctgcatgtaa tactgcaagt 540  
 ccagctgttc aatcagcata caacacaatg atgtatatta ttatctttgg ttgggctatt 600  
 taccctgtag gttactttac tggttaccta atgggtgacg gcggatctgc cttaaactta 660  
 aaccttatct ataaccttgc tgacttcgtt aacaagattc tatttggttt aattatctgg 720  
 catgttgctg ttaaagaatc ttctaattgt a 751

<210> 123  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 123

Met Gly Lys Leu Leu Met Met Leu Gly Ser Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Ser Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val  
 20 25 30

Ser Phe Gly Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Val Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
 Page 102

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala  
130 135 140

Gly Ile Met Ala Ala Leu Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp  
145 150 155 160

Ile Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys  
165 170 175

Asn Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr  
180 185 190

Ile Ile Ile Phe Gly Trp Leu Ile Tyr Pro Val Gly Tyr Ala Ser Gly  
195 200 205

Tyr Leu Met Gly Asp Gly Gly Ser Ala Met Asn Leu Asn Leu Ile Tyr  
210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 124

<211> 751

<212> DNA

<213> Marine eubacteria

<400> 124

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gggtggcgatt tggatgctag tgattacact ggtgtttcat ttgggttggt gactgcagct 120

ttattagctt caactgtatt tttctttggt gaaagagata gagtttctgc taaatggaag 180

acatctttga cagtatcagg tttagttact ggtattgctt tttggcatta cttatatatg 240

agaggtgtat gggttgaaac tgggtgaaact ccaacagtat ttagatatat tgattggtta 300

ttactgttc cattactaat ctgcgagttt tattaattc tagctgctgc aactaacgta 360

gctggttcat tattaagaa actacttggt ggttcacttg taatgcttgt gtttggtatc 420

atgggtgaag caggaatcat ggcagctttg cctgcattca ttattgggtg tttggcatgg 480  
 atatatatga tttatgagct ttgggctgga gaagggaaat ctgcatgcaa tactgcaagt 540  
 cctgccgttc aatcagctta caacaccatg atgtacatca tcatttttgg ttgggttaatc 600  
 tatccagttg gttatgcatac aggctatcta atgggcatg gcggatcagc tatgaactta 660  
 aacttaatat ataaccttgc tgactttgtt aacaagattc tatttggttt aattatctgg 720  
 aatgttgctg ttaaagaatc ttctaagtct a 751

<210> 125  
 <211> 258  
 <212> PRT  
 <213> Marine eubacteria

<400> 125

Met Gly Lys Gly Leu Leu Met Leu Gly Ser Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asn Leu Asn Ala Ala Asp Val Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Ile Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Val Asp Ser Trp Asn Pro Glu Thr Gly Met Gly Glu  
 85 90 95

Ser Pro Thr Glu Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu  
 100 105 110

Leu Ile Cys Glu Phe Tyr Leu Ile Leu Ala Ala Ala Thr Asn Val Ala  
 115 120 125

Gly Ser Leu Phe Lys Lys Leu Leu Val Gly Ser Leu Val Met Leu Ile  
 130 135 140

Ala Gly Tyr Met Gly Glu Ser Gly Asn Ala Asn Val Met Ile Ala Phe  
 145 150 155 160

Val Val Gly Cys Leu Ala Trp Leu Tyr Met Ile Tyr Glu Leu Trp Ala  
 165 170 175

Gly Glu Gly Lys Ala Ala Cys Asn Thr Ala Ser Pro Ala Val Gln Ser  
                   180                                  185                                  190

Ala Tyr Asn Thr Met Met Trp Ile Ile Ile Val Gly Trp Ala Ile Tyr  
                   195                                  200                                  205

Pro Ala Gly Tyr Ala Ala Gly Tyr Leu Met Gly Gly Glu Ser Val Tyr  
                   210                                  215                                  220

Ala Ser Asn Leu Asn Leu Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys  
                   225                                  230                                  235                                  240

Ile Leu Phe Gly Leu Ile Ile Trp His Val Ala Val Lys Glu Ser Ser  
                                   245                                  250                                  255

Asn Ala

<210> 126  
 <211> 775  
 <212> DNA  
 <213> Marine eubacteria

<400> 126  
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 ggaggcaact taaatgcagc tgatgtaact ggtgtatctt tttggctagt tactgccgct 120  
 ttacttgctt caacagtatt cttttttatt gaaagagata gagtttctgc aaaatggaag 180  
 acatcactaa cagtatctgg tttagttact ggtattgctt tttggcatta cctttacatg 240  
 agaggtgttt ggggttgattc ttggaatcct gaaacaggaa tgggagaatc tccaactgaa 300  
 tttagatata ttgattgggtt actaacagta cctttatttaa tttgtgagtt ttatctaata 360  
 ttagctgctg caacaaatgt tgctggttca ttattcaaaa aattattagt tggttcattg 420  
 gtcattgctta ttgcaggata catgggtgaa tctggtaatg ccaatgtgat gattgcattc 480  
 gtagttggat gcttagcatg gttgtatatg atatatgaat tgtgggctgg tgaaggtaaa 540  
 gcagcttgca atacagcaag ccctgctggt caatcagcat acaatacaat gatgtggatc 600  
 attattgtag gttgggctat atatcctgct ggatatgctg ctggctatctt gatgggtgga 660  
 gaaagcgttt atgcttctaa ccttaacctg atatataacc ttgctgactt tgtaacaag 720  
 attttatttg gtttaatcat ttggcatggt gctgttaaag aatcttctaa tgcta 775

<210> 127  
 <211> 257  
 <212> PRT  
 <213> Marine eubacteria

&lt;400&gt; 127

Met Gly Lys Leu Leu Val Met Leu Gly Ser Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asn Leu Asp Ala Ala Asp Val Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe  
 35 40 45

Phe Ile Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Val Asp Ser Trp Thr Gly Pro Gly Thr Gly Glu Ser  
 85 90 95

Pro Thr Glu Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu  
 100 105 110

Ile Cys Glu Phe Tyr Leu Ile Leu Ala Ala Ala Thr Asn Val Ala Gly  
 115 120 125

Ser Leu Phe Lys Lys Leu Leu Val Gly Ser Leu Val Met Leu Ile Ala  
 130 135 140

Gly Tyr Met Gly Glu Ser Gly Asn Ala Asn Val Met Ile Ala Phe Val  
 145 150 155 160

Val Gly Cys Leu Ala Trp Leu Tyr Met Ile Tyr Glu Leu Trp Ala Gly  
 165 170 175

Glu Gly Lys Ala Ala Cys Asn Thr Ala Ser Pro Ala Val Gln Ser Ala  
 180 185 190

Tyr Asn Thr Met Met Trp Ile Ile Ile Val Gly Trp Ala Ile Tyr Pro  
 195 200 205

Ala Gly Tyr Ala Ala Gly Tyr Leu Met Gly Gly Glu Ser Val Tyr Ala  
 210 215 220

Ser Asn Leu Asn Leu Ile Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile  
 225 230 235 240

Leu Phe Gly Leu Ile Ile Trp His Val Ala Val Lys Glu Ser Ser Asn  
 Page 106

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<210> 128  
 <211> 772  
 <212> DNA  
 <213> Marine eubacteria

<400> 128  
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 acatcactaa cagtatctgg tttagttact ggtattgcat tttggcatta cttttatatg 240  
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 agcgtttatg cttctaacct taacctgata tataaccttg ctgactttgt taacaagatt 720  
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<210> 129  
 <211> 249  
 <212> PRT  
 <213> Marine eubacteria

<400> 129

Met Gly Lys Leu Leu Val Met Leu Gly Gly Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ile Gly Asp Ser Val Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Met Leu Ala Ala Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Asp Thr Gly Gly Ser Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Val Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu Ala  
130 135 140

Gly Leu Ala Pro Ala Leu Pro Ala Phe Ile Leu Gly Met Ala Gly Trp  
145 150 155 160

Val Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala Val  
165 170 175

Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met Met  
180 185 190

Ile Ile Val Phe Gly Trp Ser Ile Tyr Pro Leu Gly Tyr Val Ala Gly  
195 200 205

Tyr Leu Met Gly Ala Val Asp Pro Ser Thr Leu Asn Leu Ile Tyr Asn  
210 215 220

Leu Ala Asp Phe Ile Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp His  
225 230 235 240

Val Ala Val Lys Glu Ser Ser Asn Ala  
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<210> 130

<211> 748

<212> DNA

<213> Marine eubacteria

<400> 130

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atgttagctg ctactgtttt cttttttggt gaaagagacc aagtaagcgc aaagtggaaa 180

acatcattaa cagtatcagg ttttaattact ggtattgctt tttggcatta tctttacatg 240

agaggtgtat ggatagatac aggtggaagc ccaacagtat ttagatatat tgattggttg 300



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<210> 131
<211> 249
<212> PRT
<213> Marine eubacteria

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<400> 131
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Met Gly Lys Leu Leu Met Ile Leu Gly Gly Val Ile Ala Leu Pro Ser
1           5           10           15

```

```

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ile Gly Asp Ser Val Gly Val
                20           25           30

```

```

Ser Phe Trp Leu Val Thr Ala Ala Met Leu Ala Ala Thr Val Phe Phe
          35           40           45

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```

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr
50           55           60

```

```

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met
65           70           75           80

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Arg Gly Val Trp Ile Asp Thr Gly Gly Ser Pro Thr Val Phe Arg Tyr
          85           90           95

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Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr Leu
          100          105          110

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Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu
          115          120          125

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Leu Val Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu Ala
          130          135          140

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Gly Leu Ala Pro Ala Leu Pro Ala Phe Ile Leu Gly Met Ala Gly Trp
145           150          155          160

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Val Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala Val  
 165 170 175

Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met Met  
 180 185 190

Ile Ile Val Phe Gly Trp Ser Ile Tyr Pro Leu Gly Tyr Val Ala Gly  
 195 200 205

Tyr Leu Met Gly Ala Val Asp Pro Ser Thr Leu Asn Leu Ile Tyr Asn  
 210 215 220

Leu Ala Asp Phe Ile Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp His  
 225 230 235 240

Val Ala Val Lys Glu Ser Ser Asn Ala  
 245

<210> 132  
 <211> 748  
 <212> DNA  
 <213> Marine eubacteria

<400> 132  
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 acatcattaa cagtatcagg ttttaattact ggtattgctt tttggcatta tctttacatg 240  
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 ctaactgttc cattacaaat gggtgagttt tttttaattc ttgcagcttg tactaatgta 360  
 gctggttcat tattaagaa actgcttggt gggttcattag taatgttagg tgctggattt 420  
 gctggtgaag ctggattagc tctgcattg cctgctttca tacttggtat ggctggatgg 480  
 gtatacatga tatatgagct gtatatgggt gaaggtaaag ctgcggtgag tactgctagt 540  
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 tatccactgg gatatgttgc tggctattta atgggtgcag tagatccaag tacattaaat 660  
 ctaatataca accttgctga ttttattaat aagattttat tcggtttaat aatctggcat 720  
 gttgctgtta aagaatcttc taatgcta 748

<210> 133  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

&lt;400&gt; 133

Met Gly Lys Leu Leu Met Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Gly Gly Gly Asp Leu Asp Ile Gly Asp Ser Val Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Met Leu Ala Ala Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Val Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Ile Gly Ser Leu Val Met Leu Ile Gly Gly Phe Leu Gly Glu Ala  
 130 135 140

Gly Met Ile Asp Val Thr Leu Ala Phe Val Ile Gly Met Ala Gly Trp  
 145 150 155 160

Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala Val  
 165 170 175

Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met Leu  
 180 185 190

Ile Ile Val Val Gly Trp Ser Ile Tyr Pro Ala Gly Tyr Val Ala Gly  
 195 200 205

Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Ile Asn Lys Ile Leu Phe Gly Leu Ile Ile  
 225 230 235 240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 134  
 <211> 754  
 <212> DNA  
 <213> Marine eubacteria

<400> 134  
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 ttaactgtac cactacaaat ggtagagttt tatctgatat tagctgcatg taccaatggt 360  
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<210> 135  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 135

Met Gly Lys Gln Leu Leu Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Gly Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
130 135 140

Gly Ser Leu Pro Val Leu Pro Ala Phe Ile Val Gly Cys Leu Ala Trp  
145 150 155 160

Phe Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
165 170 175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
180 185 190

Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
195 200 205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
225 230 235 240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 136

<211> 754

<212> DNA

<213> Marine eubacteria

<400> 136

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ctcttagctg ctactgtttt cttttttggt gaaagagatc aagtaagtgc taaatggaaa 180

acatcactta cagtttctgg tttagttact ggtattgcat tctggcatta tctttatatg 240

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ctaactgttc ctttgctaata ggttgagttc tacttaatcc ttgcagcgtg cacaaatggt 360

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tggcatgttg ctgttaaaga atcttcta gcta 754

<210> 137  
<211> 251  
<212> PRT  
<213> Marine eubacteria

<400> 137

Met Gly Lys Leu Leu Met Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
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Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
115 120 125

Leu Gly Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
130 135 140

Gly Ser Leu Pro Val Leu Pro Ala Phe Ile Val Gly Cys Leu Ala Trp  
145 150 155 160

Phe Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
Page 114

165

170

175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
                   180                  185                  190

Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
                   195                  200                  205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
           210                  215                  220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
   225                  230                  235                  240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
                   245                  250

&lt;210&gt; 138

&lt;211&gt; 754

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 138

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&lt;210&gt; 139

&lt;211&gt; 251

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 139

Met Gly Lys Leu Leu Val Ile Leu Gly Gly Val Ile Ala Leu Pro Pro  
 1 5 10 15  
 Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
 20 25 30  
 Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
 35 40 45  
 Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60  
 Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80  
 Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
 85 90 95  
 Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
 100 105 110  
 Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125  
 Leu Gly Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
 130 135 140  
 Gly Ser Leu Pro Val Leu Pro Ala Phe Ile Val Gly Cys Leu Ala Trp  
 145 150 155 160  
 Phe Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
 165 170 175  
 Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
 180 185 190  
 Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
 195 200 205  
 Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
 210 215 220  
 Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
 225 230 235 240  
 Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250



<210> 140  
 <211> 754  
 <212> DNA  
 <213> Marine eubacteria

<400> 140  
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<210> 141  
 <211> 247  
 <212> PRT  
 <213> Marine eubacteria

<400> 141

Leu Leu Ile Leu Gly Gly Val Ile Ala Leu Pro Ser Phe Ala Ala Ser  
 1 5 10 15

Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val Ser Phe Trp Leu  
 20 25 30

Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe Phe Val Glu Arg  
 35 40 45

Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr Val Ser Gly Leu  
 50 55 60

Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met Arg Gly Val Trp  
 65 70 75 80

Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr Ile Asp Trp Leu  
 85 90 95

Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu Ile Leu Ala Ala  
 100 105 110

Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu Leu Gly Gly Ser  
 115 120 125

Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser Gly Ser Leu Pro  
 130 135 140

Val Leu Pro Ala Phe Ile Val Gly Cys Leu Ala Trp Phe Tyr Met Ile  
 145 150 155 160

Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val Thr Thr Ala Ser  
 165 170 175

Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu Ile Ile Val Val  
 180 185 190

Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly Tyr Leu Met Gly  
 195 200 205

Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile Tyr Asn Leu Ala  
 210 215 220

Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile Trp His Val Ala  
 225 230 235 240

Val Lys Glu Ser Ser Asn Ala  
 245

<210> 142

<211> 742

<212> DNA

<213> Marine eubacteria

<400> 142

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gtttctgggt tagttactgg tattgcattc tggcattatc tttatatgag aggtgtgtgg 240

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 tatgctgctg gttacctaata gggtaggtgat ggcgtatatg ctcagaattt aaacgttata 660  
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<210> 143  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 143

Met Gly Lys Leu Leu Leu Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Ile Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
 130 135 140

Gly Ser Leu Pro Val Leu Pro Ala Phe Leu Val Gly Cys Ala Ala Trp  
 145 150 155 160

Leu Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
 165 170 175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
180 185 190

Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
195 200 205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
225 230 235 240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 144  
<211> 754  
<212> DNA  
<213> Marine eubacteria

<400> 144  
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ctcttagctg ctactgtttt cttttttgtt gaaagagatc aagtaagcgc taaatggaaa 180  
acatcactta cagtttctgg tttagttact ggtattgcat tctggcatta tctctatatg 240  
agaggtgtgt ggatcgaaac cggtgaaaca ccaacagtat ttagatatat tgattgggtg 300  
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taccagctg gatatgctgc tggttactta atgggtggag atggcgtata tgctcagaat 660  
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tggcattgtg ctgttaaaga atcttctaata gcta 754

<210> 145  
<211> 250  
<212> PRT  
<213> Marine eubacteria

<400> 145

Met Gly Lys Leu Leu Leu Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
1 5 10 15

Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
                   20                  25                  30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
           35                  40                  45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
       50                  55                  60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
       65                  70                  75                  80

Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
           85                  90                  95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
          100                 105                 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
          115                 120                 125

Leu Ile Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
       130                 135                 140

Gly Ser Leu Pro Val Leu Pro Ala Phe Leu Val Gly Cys Ala Ala Trp  
       145                 150                 155                 160

Leu Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
          165                 170                 175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
          180                 185                 190

Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
          195                 200                 205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
       210                 215                 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
       225                 230                 235                 240

Trp His Val Ala Val Lys Glu Ser Ser Asn  
          245                 250

<210> 146  
 <211> 751

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 146

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ctcttagctg ctactgtttt cttttttggt gaaagagatc aagtaagcgc taaatggaaa      180
acatcactta cagtttctgg tttagttact ggtattgcat tctggcatta tctctatatg      240
agaggtgtgt ggatcgaaac cggtgaaaca ccaacagtat ttaggtatat tgattggttg      300
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gcagggttcat tattaagaa actactaatt ggttcgcttg taatgcttat tgcaggatat      420
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taccagctg gatatgctgc tggttactta atgggtggag atggcgata tgctcagaat      660
ttaaacgtta tatataacct tgctgacttt gttaacaaga ttttatttg tttagttatc      720
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&lt;210&gt; 147

&lt;211&gt; 251

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 147

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Met Gly Lys Leu Leu Leu Ile Leu Gly Gly Val Ile Ala Leu Pro Ser
1           5           10           15

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Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val
20           25           30

```

```

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe
35           40           45

```

```

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr
50           55           60

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```

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met
65           70           75           80

```

```

Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr
85           90           95

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Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu

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100

105

110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Ile Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
 130 135 140

Gly Ser Leu Pro Val Leu Pro Ala Phe Leu Val Gly Cys Ala Ala Trp  
 145 150 155 160

Leu Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
 165 170 175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
 180 185 190

Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
 195 200 205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
 225 230 235 240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

&lt;210&gt; 148

&lt;211&gt; 754

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 148

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ggaggcgatc ttgattctag tgatcttact ggagtatctt tttggcttgt tactgctgct 120

ctcttagctg ctactgtttt cttttttgtt gaaagagatc aagtaagcmc taaatggaaa 180

acatcactta cagtttctgg tttagttact ggtattgcat tctggcatta tctctatatg 240

agaggtgtgt ggatcgaaac cggtgaaaca ccaacagtat ttagatatat tgattgggtg 300

ctaactgttc cgttactaat ggttgagttc tacttaatcc tcgcagcttg cactaatgtt 360

gcaggttcat tattaagaa actactaatt ggttcgcttg taatgcttat tgcaggatat 420

atgggtgagt ctggaagtct tccagtattg cctgcattcc ttgttgggtg cgcagcatgg 480

ttatacatga tttatgaact atatgctggt gaaggtaagg ctgcagttac tactgctagt 540

cctgctgtta tgtctgcata caatactatg atgttgatta tcgtagtagg ttgggcaata 600  
 taccagctg gatatgctgc tggttactta atgggtggag atggcgtata tgctcagaat 660  
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 tggcatgttg ctgttaaaga atcttcta at gcta 754

<210> 149  
 <211> 251  
 <212> PRT  
 <213> Marine eubacteria

<400> 149

Met Gly Lys Arg Leu Val Ile Leu Gly Gly Val Ile Ala Leu Pro Ser  
 1 5 10 15

Phe Ala Ala Ser Gly Gly Asp Leu Asp Ser Ser Asp Leu Thr Gly Val  
 20 25 30

Ser Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ala Thr Val Phe Phe  
 35 40 45

Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr  
 50 55 60

Val Ser Gly Leu Val Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met  
 65 70 75 80

Arg Gly Val Trp Ile Glu Thr Gly Glu Thr Pro Thr Val Phe Arg Tyr  
 85 90 95

Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Val Glu Phe Tyr Leu  
 100 105 110

Ile Leu Ala Ala Cys Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu  
 115 120 125

Leu Ile Gly Ser Leu Val Met Leu Ile Ala Gly Tyr Met Gly Glu Ser  
 130 135 140

Gly Asn Leu Pro Val Leu Pro Ala Phe Leu Ile Gly Cys Ala Ala Trp  
 145 150 155 160

Leu Tyr Met Ile Tyr Glu Leu Tyr Ala Gly Glu Gly Lys Ala Ala Val  
 165 170 175

Thr Thr Ala Ser Pro Ala Val Met Ser Ala Tyr Asn Thr Met Met Leu  
 180 185 190



Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly  
 195 200 205

Tyr Leu Met Gly Gly Asp Gly Val Tyr Ala Gln Asn Leu Asn Val Ile  
 210 215 220

Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Val Ile  
 225 230 235 240

Trp His Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 150  
 <211> 754  
 <212> DNA  
 <213> Marine eubacteria

<400> 150  
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 ctcttagctg ctactgtttt cttttttggt gaaagagatc aagtaagcgc taaatggaaa 180  
 acatcactta cagtttctgg tttagttact ggtattgcat tctggcatta tctctatatg 240  
 agaggtgtgt ggatcgaaac cggtgaaaca ccaacagtat ttagatatat tgattggttg 300  
 ctaactgttc cgttactaat ggttgagttc tacttaatcc tcgcagcttg cactaatggt 360  
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 ttatacatga tttatgaact atatgctggt gaaggtaagg ctgcagttac tactgctagt 540  
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 taccagctg gatatgctgc tggttactta atgggtggag atggcgata tgctcagaat 660  
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 tggcatgttg ctgttaaaga atcttctaata gcta 754

<210> 151  
 <211> 254  
 <212> PRT  
 <213> Marine eubacteria

<400> 151

Ser Lys Lys Leu Leu Ala Thr Phe Leu Val Val Thr Ser Ile Pro Ala  
 1 5 10 15

Ile Ala Leu Ala Gly Gly His Ser Ser Gly Gly Leu Ala Gly Asp Asp  
 20 25 30

Cys Val Gly Val Thr Phe Trp Ile Ile Ser Met Ala Met Val Ala Ser  
 35 40 45  
 Thr Val Phe Phe Ile Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys  
 50 55 60  
 Thr Ser Leu Thr Val Ser Ala Leu Met Thr Leu Ile Ala Ala Val His  
 65 70 75 80  
 Tyr Phe Tyr Met Arg Asp Val Trp Val Ala Thr Gly Glu Ser Pro Thr  
 85 90 95  
 Val Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Ile  
 100 105 110  
 Glu Phe Tyr Phe Ile Leu Ala Ala Val Thr Thr Val Ser Ser Gly Ile  
 115 120 125  
 Phe Trp Arg Leu Leu Val Gly Thr Val Ile Met Leu Val Gly Gly Tyr  
 130 135 140  
 Leu Gly Glu Ala Gly Met Ile Ser Val Met Thr Gly Phe Ile Ile Gly  
 145 150 155 160  
 Met Ile Gly Trp Leu Tyr Ile Leu Tyr Glu Ile Phe Ala Gly Glu Ala  
 165 170 175  
 Ser Lys Ala Asn Ala Ser Ser Gly Ser Ala Ala Cys Gln Thr Ala Phe  
 180 185 190  
 Gly Ala Leu Arg Leu Ile Val Thr Ile Gly Trp Ala Ile Tyr Pro Leu  
 195 200 205  
 Gly Tyr Phe Leu Gly Tyr Leu Gly Gly Gly Ala Asp Pro Ala Thr Leu  
 210 215 220  
 Asn Ile Val Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Ala Phe Gly  
 225 230 235 240  
 Leu Ile Ile Trp Ala Ala Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 152  
 <211> 763  
 <212> DNA  
 <213> Marine eubacteria

<400> 152  
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atctctatgg ctatggttgc ttcaacagta ttctttattg ttgagcgtga cagagttagt 180  
gcgaaatgga aaacatcatt aacagtatca gcgcttatga ctttaatcgc agctgttcac 240  
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atagattggt tgtaacagt tccacttcta atgattgagt tctactttat ctttagcagcg 360  
gttacaactg tatcttcagg aattttctgg agattactag taggtactgt aataatgcta 420  
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atgatagggt ggctatacat tctttatgaa atctttgcag gtgaagctag caaagcaaat 540  
gcttctagtg gaagtgcagc ttgtcaaaca gcctttggag ctttacgttt aatcgttaacc 600  
attggttggg caatttatcc gctaggatat ttcttaggtt atctaggcgg tggggcagac 660  
ccagctacat taaacattgt ttacaactta gctgactttg taaacaaaat tgcttttggt 720  
ttaattatat gggcagcagc tggttaaagaa tcttctaattg cta 763

<210> 153  
<211> 254  
<212> PRT  
<213> Marine eubacteria

<400> 153

Ser Lys Lys Leu Leu Ala Thr Phe Leu Val Val Thr Ser Ile Pro Ala  
1 5 10 15

Ile Ala Leu Ala Gly Gly His Ser Ser Gly Gly Leu Ala Gly Asp Asp  
20 25 30

Tyr Val Gly Val Thr Phe Trp Ile Ile Ser Met Ala Met Val Ala Ser  
35 40 45

Thr Val Phe Phe Ile Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys  
50 55 60

Thr Ser Leu Thr Val Ser Ala Leu Val Thr Leu Ile Ala Ala Val His  
65 70 75 80

Tyr Phe Tyr Met Arg Asp Val Trp Val Ala Thr Gly Glu Ser Pro Thr  
85 90 95

Val Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Ile  
100 105 110

Glu Phe Tyr Phe Ile Leu Ala Ala Val Thr Thr Val Ser Ser Gly Ile  
 115 120 125

Phe Trp Arg Leu Leu Val Gly Thr Val Ile Met Leu Val Gly Gly Tyr  
 130 135 140

Leu Gly Glu Ala Gly Met Ile Ser Val Met Thr Gly Phe Ile Ile Gly  
 145 150 155 160

Met Ile Gly Trp Leu Tyr Ile Leu Tyr Glu Ile Phe Ala Gly Glu Ala  
 165 170 175

Ser Lys Ala Asn Ala Ser Ser Gly Ser Ala Ala Cys Gln Thr Ala Phe  
 180 185 190

Gly Ala Leu Arg Leu Ile Val Thr Ile Gly Trp Ala Ile Tyr Pro Leu  
 195 200 205

Gly Tyr Phe Leu Gly Tyr Leu Gly Gly Gly Ala Asp Pro Ala Thr Leu  
 210 215 220

Asn Ile Val Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Ala Phe Gly  
 225 230 235 240

Leu Ile Ile Trp Ala Ala Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 154  
 <211> 763  
 <212> DNA  
 <213> Marine eubacteria

<400> 154  
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 gcgaaatgga aaacatcatt aacagtatca gcgcttgtga ctttaatcgc agctgttcac 240  
 tatttctaca tgagagatgt ttgggtagca actggcgaat caccaacagt ctttagatat 300  
 atagattggt tgtaaacagt tccacttcta atgattgagt tctactttat ctttagcagcg 360  
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 gtaggtggat acttaggtga agctggaatg atttcggtaa tgacaggttt cattataggg 480  
 atgataggtt ggctatacat tctttatgaa atctttgcag gtgaagctag caaagcaa 540  
 gcttctagtg gaagtgcagc ttgtcaaaca gcctttggag ctttacgttt aatcgtaacc 600  
 attggttggg caatttatcc gctaggatat ttcttaggtt atctaggcgg tggggcagac 660

ccagctacat taaacattgt ttacaactta gctgactttg taaacaaaat tgcttttggt 720  
 ttaattatat gggcagcagc tggttaaagaa tcttctaata cta 763

<210> 155  
 <211> 254  
 <212> PRT  
 <213> Marine eubacteria  
 <400> 155

Ser Lys Lys Phe Phe Ser Thr Leu Leu Leu Val Thr Ser Leu Pro Thr  
 1 5 10 15

Leu Ala Leu Ala Gly Gly His Ser Ser Gly Leu Ala Gly Asp Asp Tyr  
 20 25 30

Val Gly Val Thr Phe Trp Ile Ile Ser Met Ala Met Val Ala Ser Thr  
 35 40 45

Val Phe Phe Ile Val Glu Arg Asp Arg Val Ser Ser Lys Trp Lys Thr  
 50 55 60

Ser Leu Thr Val Ser Ala Leu Val Thr Leu Ile Ala Ala Val His Tyr  
 65 70 75 80

Phe Tyr Met Arg Asp Val Trp Val Ala Thr Gly Glu Ser Pro Thr Val  
 85 90 95

Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Ile Glu  
 100 105 110

Phe Tyr Phe Ile Leu Ala Ala Val Thr Thr Val Ser Ser Gly Ile Phe  
 115 120 125

Trp Arg Leu Leu Ile Gly Thr Val Val Met Leu Val Gly Gly Tyr Met  
 130 135 140

Gly Glu Ala Gly Met Ile Ser Val Met Thr Gly Phe Ile Ile Gly Met  
 145 150 155 160

Ile Gly Trp Leu Tyr Ile Leu Tyr Glu Ile Phe Ala Gly Glu Ala Ser  
 165 170 175

Lys Ala Asn Ala Ser Ser Gly Ser Ala Ala Cys Gln Thr Ala Phe Gly  
 180 185 190

Ala Leu Arg Leu Ile Val Thr Val Gly Trp Ala Ile Tyr Pro Ile Gly  
 195 200 205

Tyr Phe Val Gly Tyr Leu Thr Gly Gly Gly Ala Asp Ala Ala Thr Leu  
 210 215 220

Asn Ile Val Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Ala Phe Gly  
 225 230 235 240

Leu Ile Ile Trp Ala Ala Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 156  
 <211> 763  
 <212> DNA  
 <213> Marine eubacteria

<400> 156  
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 tccatggcta tggttgcgtc aacagtatatt ttcattgtgg agcgtgacag agttagctca 180  
 aaatggaaaa catcattaac agtatcagct ttggttacat taattgctgc agtgcattat 240  
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 gattggttat taacagtgcc actattaatg attgagttct actttatttt agcagcggta 360  
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 ggtgggtata tgggtgaagc tggaatgatc tcagtgatga caggtttcat tatcgggatg 480  
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 ggttgggcga tctatccaat aggatacttc gtaggctatc taactggtgg tgggtgcagac 660  
 gcagctacac taaacatagt ttacaactta gctgattttg taaacaaaat tgcctttggt 720  
 ttaatcatat gggcagcagc tggttaaagaa tcttctaattg cta 763

<210> 157  
 <211> 254  
 <212> PRT  
 <213> Marine eubacteria

<400> 157

Ser Lys Lys Phe Phe Ser Thr Leu Leu Leu Val Thr Ser Leu Pro Thr  
 1 5 10 15

Leu Ala Leu Ala Gly Gly His Ser Ser Gly Leu Ala Gly Asp Asp Tyr  
 20 25 30

Val Gly Val Thr Phe Trp Ile Ile Ser Met Ala Met Val Ala Ser Thr  
 Page 130

35

Val Phe Phe Ile Val Glu Arg Asp Arg Val Ser Ser Lys Trp Lys Thr  
50 55 60

Ser Leu Thr Val Ser Ala Leu Val Thr Leu Ile Ala Ala Val His Tyr  
65 70 75 80

Phe Tyr Met Arg Asp Val Trp Val Ala Thr Gly Glu Ser Pro Thr Val  
85 90 95

Phe Arg Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Leu Met Ile Glu  
100 105 110

Phe Tyr Phe Ile Leu Ala Ala Val Thr Thr Val Ser Ser Gly Ile Phe  
115 120 125

Trp Arg Leu Leu Ile Gly Thr Val Val Met Leu Val Gly Gly Tyr Met  
130 135 140

Gly Glu Ala Gly Met Ile Ser Val Met Thr Gly Phe Ile Ile Gly Met  
145 150 155 160

Ile Gly Trp Leu Tyr Ile Leu Tyr Glu Ile Phe Ala Gly Glu Ala Ser  
165 170 175

Lys Ala Asn Ala Ser Ser Gly Ser Ala Ala Cys Gln Thr Ala Phe Gly  
180 185 190

Ala Leu Arg Leu Ile Val Thr Val Gly Trp Ala Ile Tyr Pro Ile Gly  
195 200 205

Tyr Phe Val Gly Tyr Leu Thr Gly Gly Gly Ala Asp Ala Ala Thr Leu  
210 215 220

Asn Ile Val Tyr Asn Leu Ala Asp Phe Val Asn Lys Ile Ala Phe Gly  
225 230 235 240

Leu Ile Ile Trp Ala Ala Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 158

<211> 763

<212> DNA

<213> Marine eubacteria

<400> 158

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60

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aaatggaaaa catcattaac agtatcagct ttggttacat taattgctgc agtgcattat 240
ttttatatga gagatgtatg ggtagcaact ggtgaatcac caacagtatt tagatatata 300
gattgggttat taacagtgcc actattaatg attgagttct actttatttt agcagcggta 360
actacagttt cttcaggaat attctggaga ctattaattg gtacagttgt aatgctagta 420
ggtgggtata tgggtgaagc tggaatgata tcagtgatga caggtttcat tatcgggatg 480
atcggttggc tatatattct ttacgaaatc tttgctggtg aagctagtaa agcaaacgct 540
tctagtggaa ggcgagcatg ccaaacagca tttggtgcgt tacgtttaat cgttacagtt 600
ggttgggcga tctatccaat aggatacttc gtaggctatc taactggtgg tgggtgcagac 660
gcagctacac taaacatagt ttacaactta gctgattttg taaacaaaat tgcctttggt 720
ttaatcatat gggcagcagc tggttaaagaa tcttctaata cta 763

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<210> 159  
 <211> 250  
 <212> PRT  
 <213> Marine eubacteria

<400> 159

Met Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro Ser Phe  
 1 5 10 15

Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly Val Ser  
 20 25 30

Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe Phe Phe  
 35 40 45

Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu Thr Val  
 50 55 60

Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr Met Arg  
 65 70 75 80

Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg Tyr Ile  
 85 90 95

Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr Leu Ile  
 100 105 110

Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys Leu Leu  
 115 120 125



Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu Ala Gly  
 130 135 140

Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly Trp Leu  
 145 150 155 160

Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala Val Ser  
 165 170 175

Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met Met Ile  
 180 185 190

Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala Gly Tyr  
 195 200 205

Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu Ile Tyr  
 210 215 220

Asn Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp  
 225 230 235 240

Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 160  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 160  
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 tacatgattt atgagctata tatgggtgaa ggtaaggctg ctgtaagtac tgcaagtcct 540  
 gctgttaact ctgcatacaa cgcaatgatg atgattattg ttgttggtat ggcaatttat 600  
 cctgctggat atgctgctgg ttacctaatg ggtggcgaag gtgtatacgc ttcaaactta 660  
 aaccttatat ataaccttgc tgactttgtt aacaagattc tatttggttt gatcatttgg 720

aatgttcag ttaaagaatc tagtaatgct

750

<210> 161  
 <211> 230  
 <212> PRT  
 <213> Marine eubacteria

<400> 161

Met Lys Val Leu Met Leu Asn Pro Gly Asp His Val Ala Ile Ser Phe  
 1 5 10 15

Trp Leu Ile Ser Met Ala Met Val Ala Ala Thr Ala Phe Phe Phe Leu  
 20 25 30

Glu Arg Asp Arg Val Ala Ala Lys Trp Lys Thr Ser Leu Thr Val Ala  
 35 40 45

Gly Leu Val Thr Gly Ile Ala Ala Trp His Tyr Phe Tyr Met Arg Gly  
 50 55 60

Val Trp Val Ala Thr Gly Asp Ser Pro Thr Val Leu Arg Tyr Ile Asp  
 65 70 75 80

Trp Leu Ile Thr Val Pro Leu Gln Ile Val Glu Phe Tyr Val Ile Leu  
 85 90 95

Ala Ala Met Thr Ala Val Ala Ser Ser Leu Phe Trp Arg Leu Leu Ile  
 100 105 110

Ala Ser Ile Ile Met Leu Val Phe Gly Tyr Met Gly Glu Thr Gly Ala  
 115 120 125

Met Asn Val Thr Leu Ala Phe Val Ile Gly Met Ala Gly Trp Leu Tyr  
 130 135 140

Ile Ile Tyr Glu Val Phe Ala Gly Glu Ala Ser Lys Ala Ser Ala Gly  
 145 150 155 160

Ser Gly Asn Ala Ala Gly Gln Thr Ala Phe Asn Ala Leu Arg Leu Ile  
 165 170 175

Val Thr Val Gly Trp Ala Ile Tyr Pro Ile Gly Tyr Ala Val Gly Tyr  
 180 185 190

Phe Gly Gly Gly Val Asp Ala Gly Ser Leu Asn Leu Ile Tyr Asn Leu  
 195 200 205

Ala Asp Phe Val Asn Lys Ile Ala Phe Gly Met Ala Ile Tyr Val Ala  
 Page 134

210

215

220

Ala Val Ser Asp Ser Asn  
225 230

<210> 162  
<211> 690  
<212> DNA  
<213> Marine eubacteria

<400> 162  
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tcattgaact taatctataa ccttgcagac tttgttaata aaattgcatt tggatatggct 660  
atztatgtag ctgcagtatc agacagcaac 690

<210> 163  
<211> 249  
<212> PRT  
<213> Marine eubacteria

<400> 163

Met Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr Phe  
1 5 10 15

Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val Ser  
20 25 30

Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe Phe  
35 40 45

Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr Val  
50 55 60

Ser Gly Leu Val Thr Gly Ile Ala Phe Trp Lys Tyr Met Tyr Met Arg  
65 70 75 80

Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr Ile  
85 90 95

Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu Ile  
100 105 110

Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu Leu  
115 120 125

Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala Gly  
130 135 140

Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp Val  
145 150 155 160

Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys Asn  
165 170 175

Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr Ile  
180 185 190

Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly Tyr  
195 200 205

Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr Asn  
210 215 220

Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp Asn  
225 230 235 240

Val Ala Val Lys Glu Ser Ser Asn Ala  
245

<210> 164

<211> 750

<212> DNA

<213> Marine eubacteria

<400> 164

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ttagcatcta ctgtattttt ctttgttgaa agagatagag tttctgcaa atggaaaaca 180

tcattaactg tatctggtct tgttactggt attgctttct ggaaatacat gtacatgaga 240

ggggtatgga ttgaaactgg tgattcgcca actgtattta gatacattga ttggttacta 300

acagttcctc tattaatatg tgaattctac ttaattcttg ctgctgcaac taatgttgct 360

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```

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<210> 165
<211> 249
<212> PRT
<213> Marine eubacteria

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<400> 165
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```
Met Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr Phe
1           5           10           15

```

```
Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val Ser
                20           25           30

```

```
Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe Phe
          35           40           45

```

```
Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr Val
  50           55           60

```

```
Ser Gly Leu Val Thr Gly Ile Ala Phe Trp Asn Tyr Met Tyr Met Arg
65           70           75           80

```

```
Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr Ile
          85           90           95

```

```
Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu Ile
          100          105          110

```

```
Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu Leu
          115          120          125

```

```
Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala Gly
          130          135          140

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Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp Val
145          150          155          160

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Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys Asn  
 165 170 175

Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr Ile  
 180 185 190

Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly Tyr  
 195 200 205

Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr Asn  
 210 215 220

Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp Asn  
 225 230 235 240

Val Ala Val Lys Glu Ser Ser Asn Ala  
 245

<210> 166  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 166  
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 cttatctata accttgctga ctttggttaac aagattctat ttggtttaat tatatggaat 720  
 gttgctgtta aagaatcttc taatgcttaa 750

<210> 167  
 <211> 249  
 <212> PRT  
 <213> Marine eubacteria

<400> 167

Met Lys Leu Leu Leu Ile Leu Gly Ser Val Ile Ala Leu Pro Thr Phe  
1 5 10 15

Ala Ala Gly Gly Gly Asp Leu Asp Ala Ser Asp Tyr Thr Gly Val Ser  
20 25 30

Phe Trp Leu Val Thr Ala Ala Leu Leu Ala Ser Thr Val Phe Phe Phe  
35 40 45

Val Glu Arg Asp Arg Val Ser Ala Lys Trp Lys Thr Ser Leu Thr Val  
50 55 60

Ser Gly Leu Val Thr Gly Ile Ala Phe Trp Gln Tyr Met Tyr Met Arg  
65 70 75 80

Gly Val Trp Ile Glu Thr Gly Asp Ser Pro Thr Val Phe Arg Tyr Ile  
85 90 95

Asp Trp Leu Leu Thr Val Pro Leu Leu Ile Cys Glu Phe Tyr Leu Ile  
100 105 110

Leu Ala Ala Ala Thr Asn Val Ala Gly Ser Leu Phe Lys Lys Leu Leu  
115 120 125

Val Gly Ser Leu Val Met Leu Val Phe Gly Tyr Met Gly Glu Ala Gly  
130 135 140

Ile Met Ala Ala Trp Pro Ala Phe Ile Ile Gly Cys Leu Ala Trp Val  
145 150 155 160

Tyr Met Ile Tyr Glu Leu Trp Ala Gly Glu Gly Lys Ser Ala Cys Asn  
165 170 175

Thr Ala Ser Pro Ala Val Gln Ser Ala Tyr Asn Thr Met Met Tyr Ile  
180 185 190

Ile Ile Phe Gly Trp Ala Ile Tyr Pro Val Gly Tyr Phe Thr Gly Tyr  
195 200 205

Leu Met Gly Asp Gly Gly Ser Ala Leu Asn Leu Asn Leu Ile Tyr Asn  
210 215 220

Leu Ala Asp Phe Val Asn Lys Ile Leu Phe Gly Leu Ile Ile Trp Asn  
225 230 235 240

Val Ala Val Lys Glu Ser Ser Asn Ala  
245

<210> 168  
 <211> 750  
 <212> DNA  
 <213> Marine eubacteria

<400> 168  
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 gttgctgtta aagaatcttc taatgcttaa 750

<210> 169  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 169

Thr Met Gly Lys Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
 1 5 10 15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp Lys Tyr Leu Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
 Page 140



Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

<210> 170  
<211> 756  
<212> DNA  
<213> Marine eubacteria

<400> 170  
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<210> 171
<211> 252
<212> PRT
<213> Marine eubacteria

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<400> 171

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Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro
1          5          10          15

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Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
          20          25          30

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Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
          35          40          45

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Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu
          50          55          60

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Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp Asn Tyr Leu Tyr
          65          70          75          80

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Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg
          85          90          95

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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr
          100          105          110

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Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys
          115          120          125

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Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu
          130          135          140

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Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly
          145          150          155          160

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Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala
          165          170          175

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Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 172  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 172  
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<210> 173  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 173

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
 1 5 10 15

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 20 25 30  
 Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45  
 Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60  
 Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp Gln Tyr Leu Tyr  
 65 70 75 80  
 Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
 85 90 95  
 Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110  
 Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125  
 Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140  
 Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160  
 Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175  
 Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190  
 Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205  
 Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220  
 Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240  
 Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

&lt;210&gt; 174

&lt;211&gt; 756

&lt;212&gt; DNA

&lt;213&gt; Marine eubacteria

&lt;400&gt; 174

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&lt;210&gt; 175

&lt;211&gt; 252

&lt;212&gt; PRT

&lt;213&gt; Marine eubacteria

&lt;400&gt; 175

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Thr Met Gly Lys Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro
1           5           10          15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
          20           25           30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
          35           40           45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu
          50           55           60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp Glu Tyr Leu Tyr
65           70           75           80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg
          85           90           95

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Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 176  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 176  
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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttgctgtatc tggtttaatt actgggtag ctttttggga atatctctat 240  
 atgagaggtg tttggataga cactgggtgat accccaacag tattcagata tattgattgg 300  
 ttattaactg ttccattaca aatgggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
 gttgctgctt cattatttaa gaagcttcta gctgggtcat tagtaatgtt aggtgctgga 420  
 tttgcaggcg aagctggatt agctcctgta ttacctgctt tcattattgg tatggctgga 480  
 tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca 540  
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agtcctgctg ttaactctgc atacaacgca atgatgatga ttattgttgt tggatgggca 600  
 atttatacctg ctggatatgc tgctgggttac ctaatgggtg gcgaagggtg atacgcttca 660  
 aacttaaacc ttatatataa ccttgccgac cttgttaaca agattctatt tggtttgatc 720  
 atttggaatg ttgctgttaa agaattctct aatgct 756

<210> 177  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 177

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
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 20 25 30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
 35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
 50 55 60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp Trp Tyr Leu Tyr  
 65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Arg  
 85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
 100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 178  
 <211> 756  
 <212> DNA  
 <213> Marine eubacteria

<400> 178  
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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttgctgtatc tggtttaatt actggtatag ctttttggtg gtatctctat 240  
 atgagaggtg tttggataga cactggtgat accccaacag tattcagata tattgattgg 300  
 ttattaactg ttccattaca aatgggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
 gttgctgctt cattatttaa gaagcttcta gctggttcat tagtaatgtt aggtgctgga 420  
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 tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca 540  
 agtcctgctg ttaactctgc atacaacgca atgatgatga ttattgttgt tggatgggca 600  
 atttatcctg ctggatatgc tgctggttac ctaatgggtg gcgaaggtgt atacgcttca 660  
 aacttaaacc ttatatataa cttgcccagac cttgttaaca agattctatt tggtttgatc 720  
 atttggaatg ttgctgttaa agaattcttct aatgct 756

<210> 179  
 <211> 252  
 <212> PRT  
 <213> Marine eubacteria

<400> 179

Thr Met Gly Lys Leu Leu Leu Ile Leu Gly Ser Ala Ile Ala Leu Pro  
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Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly  
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20

25

30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
           35                          40                          45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
      50                          55                          60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
   65                          70                          75                          80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Ala  
                           85                          90                          95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
                           100                          105                          110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
          115                          120                          125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
   130                          135                          140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
  145                          150                          155                          160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
                           165                          170                          175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
                           180                          185                          190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
          195                          200                          205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
   210                          215                          220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
  225                          230                          235                          240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
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<210> 180

<211> 756

<212> DNA

<213> Marine eubacteria

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gggatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg      180
aaaacttcac ttgctgtatc tggtttaatt actggtatag ctttttggca ttatctctat    240
atgagagggtg tttggataga cactgggtgat accccaacag tattcgcata tattgattgg    300
ttattaactg ttccattaca aatgggttgag ttctatctaa ttcttgctgc ttgtacaagt    360
gttgctgctt cattatttaa gaagcttcta gctggttcat tagtaatgtt aggtgctgga    420
tttgaggcg aagctggatt agctcctgta ttacctgctt tcattattgg tatggctgga    480
tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca    540
agtcctgctg ttaactctgc atacaacgca atgatgatga ttattgttgt tggatgggca    600
atztatcctg ctggatatgc tgctggttac ctaatgggtg gcgaagggtg atacgcttca    660
aacttaaacc ttatatataa cttgcccgcac cttgttaaca agattctatt tggtttgatc    720
atttggaatg ttgctgttaa agaatcttct aatgct                                756

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<210> 181
<211> 252
<212> PRT
<213> Marine eubacteria

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<400> 181

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1          5          10          15

Ser Phe Ala Ala Ala Gly Gly Asp Leu Asp Ile Ser Asp Thr Val Gly
          20          25          30

Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe
          35          40          45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu
          50          55          60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr
65          70          75          80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Glu
          85          90          95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr
          100         105         110

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Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
 115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
 130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
 145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
 165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
 180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
 195 200 205

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
 210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
 225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
 245 250

<210> 182  
 <211> 756  
 <212> DNA  
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 ggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
 aaaacttcac ttgctgtatc tggtttaatt actggtatag ctttttggca ttatctctat 240  
 atgagaggtg tttggataga cactggtgat accccaacag tattcgaata tattgattgg 300  
 ttattaactg ttccattaca aatggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
 gttgctgctt cattatttaa gaagcttcta gctggttcat tagtaatgtt aggtgctgga 420  
 tttgcaggcg aagctggatt agctcctgta ttacctgctt tcattattgg tatggctgga 480  
 tggttataca tgatttatga gctatatatg ggtgaaggta aggctgctgt aagtactgca 540  
 agtcctgctg ttaactctgc atacaacgca atgatgatga ttattgttgt tggatgggca 600

atttattcctg ctggatatgc tgctgggttac ctaatgggtg gcgaagggtg atacgcttca 660  
aacttaaacc ttatatataa ccttgccgac cttgttaaca agattctatt tggtttgatc 720  
atttggaatg ttgctgttaa agaattctct aatgct 756

<210> 183  
<211> 252  
<212> PRT  
<213> Marine eubacteria

<400> 183

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Val Ser Phe Trp Leu Val Thr Ala Gly Met Leu Ala Ala Thr Val Phe  
35 40 45

Phe Phe Val Glu Arg Asp Gln Val Ser Ala Lys Trp Lys Thr Ser Leu  
50 55 60

Ala Val Ser Gly Leu Ile Thr Gly Ile Ala Phe Trp His Tyr Leu Tyr  
65 70 75 80

Met Arg Gly Val Trp Ile Asp Thr Gly Asp Thr Pro Thr Val Phe Gln  
85 90 95

Tyr Ile Asp Trp Leu Leu Thr Val Pro Leu Gln Met Val Glu Phe Tyr  
100 105 110

Leu Ile Leu Ala Ala Cys Thr Ser Val Ala Ala Ser Leu Phe Lys Lys  
115 120 125

Leu Leu Ala Gly Ser Leu Val Met Leu Gly Ala Gly Phe Ala Gly Glu  
130 135 140

Ala Gly Leu Ala Pro Val Leu Pro Ala Phe Ile Ile Gly Met Ala Gly  
145 150 155 160

Trp Leu Tyr Met Ile Tyr Glu Leu Tyr Met Gly Glu Gly Lys Ala Ala  
165 170 175

Val Ser Thr Ala Ser Pro Ala Val Asn Ser Ala Tyr Asn Ala Met Met  
180 185 190

Met Ile Ile Val Val Gly Trp Ala Ile Tyr Pro Ala Gly Tyr Ala Ala  
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195

Gly Tyr Leu Met Gly Gly Glu Gly Val Tyr Ala Ser Asn Leu Asn Leu  
210 215 220

Ile Tyr Asn Leu Ala Asp Leu Val Asn Lys Ile Leu Phe Gly Leu Ile  
225 230 235 240

Ile Trp Asn Val Ala Val Lys Glu Ser Ser Asn Ala  
245 250

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<211> 756  
<212> DNA  
<213> Marine eubacteria

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gggtatgttag cggcaactgt gttctttttt gtagaaagag accaagtcag cgctaagtgg 180  
aaaacttcac ttgctgtatc tggtttaatt actggtatag ctttttggca ttatctctat 240  
atgagaggtg tttggataga cactgggtgat accccaacag tattccaata tattgattgg 300  
ttattaactg ttccattaca aatgggttgag ttctatctaa ttcttgctgc ttgtacaagt 360  
gttgctgctt cattatttaa gaagcttcta gctgggtcat tagtaatgtt aggtgctgga 420  
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atttatcctg ctggatatgc tgctgggttac ctaatgggtg gcgaagggtg atacgcttca 660  
aacttaaacc ttatatataa cttgcccagc cttgttaaca agattctatt tggtttgatc 720  
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<210> 186  
<211> 24  
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<400> 186

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24

<210> 187

<211> 21

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<400> 187

gaggtatata ttaatgtatc g

21

<210> 188

<211> 18

<212> DNA

<213> artificial sequence

<400> 188

gatttaatct gtatcagg

18

<210> 189

<211> 45

<212> DNA

<213> artificial sequence

<400> 189

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45

<210> 190

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<212> DNA

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<400> 190

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<210> 191

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45

<210> 192

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45

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<211> 45

<212> DNA

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 <211> 44  
 <212> DNA  
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<210> 207  
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<210> 210  
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<400> 210  
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<400> 211  
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<210> 212  
<211> 45  
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<213> artificial sequence

<400> 212

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